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Patent
Attorney's Docket No. 032745-020

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of

Werner GROH et al.

Application No.: 09/619,535

Filed: July 19, 2000

For: NON-WOVEN LAMINATE
COMPOSITE

) MAIL STOP AF
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) Group Art Unit: 1771
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) Examiner: Lynda Salvatore
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) Confirmation No.: 2257
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REPLY BRIEF

Commissioner for Patents
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Sir:

This is in reply to new issues raised in the Examiner's Answer mailed August 29, 2005, in the above-identified application.

It is important to recognize that the bonding process disclosed in Baravian et al '395 requires the use of an adhesive. This type of assembly only bonds the surfaces of the respective layers together. The adhesive is not dispersed homogeneously throughout the laminate. Appellants' products are prepared without adhesive bonding.

According to Baravian et al '395, needling or seam knitting is used as a secondary bonding technique when the glass fiber layer is in the form of a grid or cloth. Appellants' have argued that this reference fails to disclose any needling conditions to bind the layers, let alone the claimed feature of needling such that a portion of the synthetic fibers penetrate a side of the glass fiber layer facing away from the synthetic fiber layer. The Answer argues

that it would have been obvious to needle the layers in Baravian et al '395 such that they are non-detachable, citing Hiers '023.

Appellants note that the layers in the laminates of Baravian et al '395 are already adhesively bonded so it is mere speculation to consider what type of needling conditions would be sufficient for the secondary bonding of the layers. No direction is given in this document.

Even if motivation existed to combine the disclosures of Baravian et al '395 and Hiers '023, the resultant laminate would not have a portion of the synthetic fibers penetrating a surface of the glass fiber layer as set forth in the present claims. The specification of Hiers '023 is silent on this aspect of the present claimed invention, nor do the Figures clearly show synthetic fibers penetrating a side of the glass fiber layer opposite the synthetic layer.

With regard to the features of claims 3, 7 and 8, Appellants note that Baravian et al '395 expressly indicates that a three-layer arrangement should be avoided (column 2, line 15). The Examiner's contention (page 8 of the Answer) that this is an alternative structure encompassed by the disclosure of the reference is without merit. The adhesive bonding process of Baravian et al '395 is designed to eliminate a third layer and still provide acceptable properties.

The Examiner's Answer on page 9, second paragraph, argues that the appealed claims do not limit needling such as to inter-lock the layers together. None of the cited art discloses needling where a part of the synthetic fibers penetrate the surface of the glass fiber layer. These fibers act to inter-lock the fibrous layers together and also serve to inter-lock the subsequently applied layers of bitumen or polymer. The statement that needling in Baravian et al '395 would inherently act to pass fibers through layers (i.e., organic fibers through the

glass fiber layer) is mere speculation in the absence of any disclosure in the reference regarding needling conditions to bind the layers.

The presently claimed invention requires that at least part of the synthetic fibers penetrate the surface of the glass fiber layer. This is done to provide lamination strength by anchoring the polymeric fibers to the glass mat surface upon subsequent impregnation with bitumen. Appellants do not use a final consolidation binder but still achieve a binder-free laminate with excellent mechanical properties.

The Answer argued on page 6 that it would have been obvious to optimize the number of needle strokes in Hiers '023 as a function of desired end use. In response, Appellants note that it was generally known in the art that a pre-consolidated glass fiber mat cannot be needled without damaging the glass fibers (widely discussed in Hiers '023). Possible solutions to overcome this problem were the use of non-consolidated glass fiber mats (Hiers '023), or the application of a consolidation binder to the final laminate to "heal" the damages caused by the needling (Heidel et al '629). A laminate composed of a glass mat and a polymer mat can also be manufactured by gluing the two layers together. It must be understood that gluing and consolidation by a binder are clearly different with respect to manufacturing, processing and product performance. Hiers '023 takes the route of using a non-consolidated glass fiber mat; the fibers can freely move to avoid damage. However, this inevitably requires a large number of stitches to achieve a reasonable delaminating strength. Note that this method requires un-bonded glass fibers. Such laid mats are different than the consolidated mats that Appellants are using. They are different in their properties, production methods and processing, and, therefore, they are different laminate constituents.

Heidel et al '629 takes the second route using pre-consolidated glass mats and needling them to the polymer mat. This requires an additional consolidation step after needling. Without the end-consolidation this mat will not be able to perform.

Thus, the cited combination of prior art does not disclose or suggest the presently claimed invention where a pre-consolidated non-woven mat of glass fibers and a non-woven mat of synthetic fibers are assembled using a specially designed needling technique to provide a laminate with excellent mechanical properties without the application of a consolidation binder or a hot-melt polymeric adhesive.

In conclusion, the prior art rejections fail to establish a prima facie case of obviousness for the reasons given in the Appeal Brief filed June 2, 2005, and those set forth above.

Respectfully submitted,

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